

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Claims 1-9 (Canceled).

Claim 10 (Currently Amended): A method for autothermal reforming to produce hydrogen or a synthesis gas, comprising contacting a feedstock as a starting material and a reforming gas comprising oxygen and steam with a catalyst,

wherein

the catalyst comprises ruthenium supported on a zirconia carrier and an amount of ruthenium supported on the carrier is from 0.05 to 20 wt.% based on the entirety of the catalyst;

a ratio of steam to the feedstock fed to the reaction system is from ~~0.1 to 10~~ 0.4 to 4 in terms of the number of water molecules/the number of carbon atoms in the feedstock; and

a ratio of oxygen to the feedstock fed to the reaction system is from ~~0.1 to 1~~ 0.2 to 0.8 in terms of the number of oxygen molecules/the number of carbon atoms in the feedstock.

Claim 11: (Canceled).

Claim 12 (Currently Amended): A method for autothermal reforming to produce hydrogen or a synthesis gas, comprising contacting a feedstock as a starting material and a reforming gas comprising oxygen and steam with a catalyst,

wherein

the catalyst comprises zirconium and ruthenium supported on an inorganic oxide carrier and an amount of zirconium on the carrier is from 0.05 to 20 wt.% as reduced to ZrO₂ based on the entirety of the catalyst;

a ratio of steam to the feedstock fed to the reaction system is from ~~0.1 to 10~~ 0.4 to 4 in terms of the number of water molecules/the number of carbon atoms in the feedstock;

and a ratio of oxygen to the feedstock fed to the reaction system is from ~~0.1 to 1~~ 0.2 to 0.8 in terms of the number of oxygen molecules/the number of carbon atoms in the feedstock.

Claim 13 (Previously Presented): The method according to claim 12, wherein the starting material is a hydrocarbon.

Claim 14 (Previously Presented): The method according to claim 13, wherein the hydrocarbon is at least one member selected from the group consisting of methane, liquefied petroleum gas, naphtha, kerosene, and gas oil.

Claim 15 (Currently Amended): The method according to claim 12, wherein the hydrocarbon feedstock is at least one member selected from the group consisting of methanol, ethanol, and dimethyl ether.

Claim 16 (Previously Presented): The method according to claim 12, wherein the reforming gas comprises a mixture of oxygen, steam and carbon dioxide.

Claim 17 (Currently Amended): A method for reforming hydrocarbon, comprising contacting the hydrocarbon and carbon dioxide gas with a catalyst,
wherein

the catalyst comprises ruthenium supported on a zirconia carrier and an amount of ruthenium supported on the carrier is from 0.05 to 20 wt.% based on the entirety of the catalyst; and

a ratio of feedstock hydrocarbons to carbon dioxide is from ~~1-to-20~~ 0.1 to 3 in terms of the number of carbon dioxide molecules/the number of carbon atoms in the hydrocarbons.

Claim 18 (Currently Amended): A method for reforming hydrocarbon, comprising contacting the hydrocarbon and carbon dioxide gas with a catalyst comprising zirconium and ruthenium supported on an inorganic oxide carrier,

wherein

the catalyst comprises an amount of zirconium supported on the carrier of from 0.05 to 20 wt.% zirconium as reduced to ZrO₂ based on the entirety of the catalyst; and

a ratio of feedstock hydrocarbons to carbon dioxide is from ~~1-to-20~~ 0.1 to 3 in terms of the number of carbon dioxide molecules/the number of carbon atoms in the hydrocarbons.

Claim 19 (Currently Amended): The method according to claim ~~17 or 18~~, wherein the ruthenium is present in an amount of from 0.05 to 20 wt.%.

Claim 20 (Previously Presented): The method according to claim 17, wherein the catalyst supported on the zirconia carrier further contains at least one member selected from the group consisting of cobalt and magnesium.

Claim 21 (Previously Presented): The method according to claim 20, wherein the cobalt content is from 0.01 to 30 based on the atomic ratio of cobalt to ruthenium.

Claim 22 (Previously Presented): The method according to claim 20, wherein the magnesium content is from 0.5 to 20 wt.% as reduced to MgO based on the entirety of the catalyst.

Claim 23 (Previously Presented): The method according to claim 18, wherein the inorganic oxide carrier comprises alumina.

Claim 24 (Previously Presented): The method according to claim 23, wherein the alumina is at least one member selected from the group consisting of α -alumina and γ -alumina.

Claims 25: (Canceled).

Claim 26 (Currently Amended): The method according to claim 18, wherein the catalyst supported on the inorganic oxide carrier further contains at least one member selected from the group consisting of cobalt and magnesium.

Claim 27 (Previously Presented): The method according to claim 26, wherein the cobalt content is from 0.01 to 30 based on the atomic ratio of cobalt to ruthenium.

Claim 28 (Canceled)

Claim 29 (Previously Presented): The method according to claim 17, wherein the hydrocarbon is methane.

Claim 30 (Currently Amended): A The method for reforming hydrocarbon according to ~~any one of claims~~ Claim 17, wherein the hydrocarbon is a natural gas.

Claim 31 (Previously Presented): The method for reforming hydrocarbon according to Claim 17, wherein carbon dioxide gas and steam contact the catalyst, a ratio of steam to carbon contained in the hydrocarbon is less than 10, and a ratio of carbon dioxide to carbon contained hydrocarbon is from 20/80 to 70/30.

Claim 32 (Previously Presented): The method according to claim 18, wherein ruthenium is present in an amount of from 0.05 to 20 wt.% based on the entirety of the catalyst.

Claim 33 (Previously Presented) The method according to claim 26, wherein the magnesium content is from 0.5 to 20 wt.% as reduced to MgO based on the entirety of the catalyst.

BASIS FOR THE AMENDMENT

The amendment of Claims 10 and 12 is supported at page 27, line 11 and at page 27, line 20. The amendment of Claim 17 and 18 is supported at page 28, line 13. The amendment of Claim 15 is supported at page 22, last paragraph and by Claim 15 as originally filed. Claims 19, 26 and 30 have been amended to correct minor informal errors.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 10, 12-24, 26, 27 and 29-33 will now be active in this application.